UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/066,529	01/31/2002	Ronald A. Askeland	100201207-1	3681

7590 06/13/2006

HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Fort Collins, CO 80527-2400

EXAMINER	
NGUYEN, LAM S	
ART UNIT	**PAPER NUMBER**
2853	

DATE MAILED: 06/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/066,529
Filing Date: January 31, 2002
Appellant(s): ASKELAND ET AL.

MAILED

JUN 1 3 2006

GROUP 2800

RONALD A. ASKELAND
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 04/11/2006 appealing from the Office action mailed 01/30/2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4,791,435	SMITH ET AL.	12-1988
6,302,507	PRAKASH ET AL.	10-2001

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 3, 24, 27, 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Smith et al. (US 4791435).

Smith et al. discloses a printhead temperature control system, comprising:

Referring to claims 24, 27, 31:

a printhead assembly having a plurality of ejection elements (*column 2, lines 5-12: A corresponding element that causes ink firing through a nozzle*);

a temperature sensor configured to generate a measured temperature of the printhead assembly (*column 1, lines 57-66 and column 4, lines 30-41*);

a memory device configured to store a thermal response model of the printhead assembly and an ejection history of the ejection elements (*column 1, line 53 to column 2, line 2: A corresponding memory stores thermal models of the pens or printheads and the profiles of use of the nozzles*);

a controller (*FIG. 2A, element 2*) configured to estimate an actual temperature of the printhead assembly on the measured/current operating temperature of the printhead assembly, the thermal response model of the printhead assembly, and the ejection history (current operating parameters) of the ejection elemetns (*column 4, lines 38-40: Such temperature sensors are used to provide the input needed to estimate the printhead temperature. Column 1, lines 64-67: Thermal models of the pens or printheads are provided and these are used in conjunction with printhead temperature sensors to provide the information useful in controlling the printhead temperature. Column 1, line 68 to column 2, line 2: Profiles of the use of the*

nozzles compared with a thermal model provide information useful in controlling head temperature. Column 1, lines 15-19: The printhead temperature varies with the use profile of the printhead),

wherein the ejection history of the ejection elements identifies whether the ejection element have been fired and whether the ejection elements have not been fired (*column 2, lines 20-37*), and wherein the thermal response model of the printhead assembly includes a first set of parameters when the ejection elements have been fired and a second set of parameters when the ejection elements have not fired (*column 2, lines 1-25: Two set parameters, each regards to low temperature mode if the ejection elements have not been fired and high temperature mode if the ejection elements have been fired, may include parameters of low energy pulses for warming purpose or parameters of the operable range of a particular nozzle*).

Referring to claim 3: wherein the controller is located on at least one of the printhead or externally on a printer (*FIG. 2A*).

2. Claims 4-9, 10-11, 21-22, 25, 28, 30, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. (US 4791435) in view of Prakash et al. (US 6302507).

Smith et al. discloses the claimed invention as discussed above and calculating an adjusted pulse width based on the current operating parameters of the printhead and the estimated actual operating temperature of the printhead (*column 2, lines 54-68 and column 4, lines 45-50*), but does not disclose wherein the calculation of the adjusted pulse width is based on pulse width calibration data or based on an optimal operating temperature (**Referring to claims 25, 28, 32**), wherein the pulse width calibration data is in the form of an equation or in a look-up table (**Referring to claims 10-11, 21-22**), wherein the controller reads the pulse width and pulse

width calibration data from a memory located on the printhead assembly or a printer associated with the printhead assembly (**Referring to claims 4-5**), wherein the temperature sensor is an analog or digital temperature sensor and further including an analog to digital converter for generating a digital format from the analog temperature sensor (**Referring to claims 6-8**), wherein the temperature sensor includes multiple temperate sensors distributed around the printhead assembly (**Referring to claim 9**).

Prakash et al. discloses a temperature control system for an ink jet printhead assembly having ink ejection elements energizable by an electrical pulse having an amplitude and pulse width (*Abstract*), wherein the temperature control system includes a controller that calculates an adjusted pulse width based on pulse width calibration data (*Abstract*) or based on an optimal operating temperature (*column 13, lines 24-32*), wherein the pulse width calibration data is in the form of an equation or in a look-up table (*claims 10-11*), wherein the controller reads the pulse width and pulse width calibration data from a memory located on the printhead assembly or a printer associated with the printhead assembly (*claims 4-5*), wherein the temperature sensor is an analog or digital temperature sensor and further including an analog to digital converter for generating a digital format from the analog temperature sensor (*claims 7-8*), wherein the temperature sensor includes multiple temperate sensors distributed around the printhead assembly (*claim 9*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the calculation of energy of driving pulse disclosed by Smith et al. also based on pulse width calibration data as disclosed by Prakash et al. The motivation for doing

so is to ensure adequate firing energy levels for full drop volume firing in "blackout conditions" as taught by Prakash et al. (*column 11, lines 25-29*).

(10) Response to Argument

In response to rejection under 35 U.S.C. § 102, the appellant argued that the use profile of Smith et al. patent was used to control printhead temperature and maintain uniformity in the ink drops, not estimate the printhead temperature. The appellant then, in regarding to rejection under 35 U.S.C. § 103, asserted that the Smith et al. patent in view of the Prakash et al., in the manner suggested by the examiner, did not teach or suggest all of the limitations of the present claims.

The examiner's point of view is as follows:

The claim limitation "*estimate an actual temperature of the printhead assembly based on the measured temperature of the printhead assembly, the thermal response model of the printhead assembly, and the ejection history of the ejection elements*" is interpreted in light of the specification as a process that takes into account the measured temperature, the thermal response model, and the ejection history to provide an information named "actual temperature" and used to allow optimized energy deliver to ejection elements (*specification, page 15, lines 25-26*). For the record, Appellant's claimed "actual temperature" is in reality an "effective temperature" but the examiner will continue to use Appellant's language in light of their own disclosure. The claim language does not define how the estimation actually processes the measured temperature, the thermal response model, and the ejection history (considered as inputs of the process) to provide the "actual temperature" (considered as output of the process). Therefore, in view of the above interpretation, Smith et al.'s process, that uses the measured/current temperature (the output of the thermistor) in conjunction with thermal models (thermal response) that is compared

with the nozzle profile (ejection history) to provide an information or condition in order to control the printhead temperature accordantly by adjusting or optimizing a pulse-width energy provided to ejection/printing elements, anticipates the claimed estimation because both processes take into account the same input information and provide outputs having the same function.

The Appellant also asserted that the Smith et al. patent does not disclose wherein the thermal response model includes (a) first set of parameters when the ejection element have been fired and (b) a second set of parameters when the ejection element have not been fired. The Smith process, in fact, considers two parameters, low printhead temperature and high printhead temperature, each due to the use profile of the nozzles such as the nozzle has been fired (used) or has not been fired (unused) to control the head temperature. When the nozzle has not been fired or unused for some time, heat is not produced or reduced; the printhead temperature thus is low. When the nozzle has been fired or used frequently, heat is produced and accumulated; the printhead temperature thus is high. At low temperature, thermal response of the controller is sending low energy pulses to heat a nozzle for warming purpose to raise the printhead temperature to a desired value. At high temperature, the controller responses by stop printing/firing until the temperature drops or the controller alternatively uses another nozzle for printing instead (column 2, lines 1-25). The Smith et al. patent thus teaches the first and second parameters regarding to the use of the ejection element (nozzle) for firing.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

LN

05/31/2006

Conferees:

STEPHEN MEIER

DREW DUNN DAD

LAM NGUYEN LN

STEPHEN MEIER
SUPERVISORY PATENT EXAMINER